NON-PUBLIC?: N
ACCESSION #: 8906140299
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Braidwood 2 PAGE: 1 OF 04

DOCKET NUMBER: 05000457

TITLE: Reactor Trip Due to a 345KV Switchyard Breaker Defective Trip Coil
EVENT DATE: 05/11/89 LER #: 89-002-00 REPORT DATE: 06/08/89

OPERATING MODE: 1 POWER LEVEL: 067

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: R. Rountree, Technical Staff Engineer TELEPHONE: (815)458-2801

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: BA COMPONENT: AMP MANUFACTURER: W120
REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 0447 on May 11, 1989, Braidwood 345 KV Bus 11 received a trip signal from Transmission Sub Station (TSS) 177. The A Phase of Bus Tie (BTCB) 10-11 opened more slowly than the "B" and "C" phases. A Local Breaker Backup (LBB) signal was initiated. This sent a trip signal to Unit 2 Main Generator Lockout Relays. This caused a Reactor Trip. The 2C Steam Generator (SG) Level spiked resulting in a Feedwater Isolation. The Auxiliary Feedwater Pumps (AF) auto started. Stable plant conditions were immediately established. At 0540 the flow control valve from the 2A AF Pump to the 2A SG would not go full open. The instrument air to the valve was isolated and it failed open. Flow was controlled by throttling the Motor Operated isolation valve. The root cause of this event was a defective trip coil for the A Phase of BTCB 10-11. The cause of the level spike on the 2C SG was a pressure spike from sudden loss of steam flow. The cause of the AF valve failure was defective control card. The cause of the trip signal from TSS 177 was noise on the microwave channels. The A phase trip coil has been repaired. The LBB relay time delays were increased. The defective control card has been replaced. The microwave unit at TSS 177 will be replaced. There was a previous occurrence of a Loss of a Switchyard Bus due to an LBB initiation.

Previous corrective actions were not applicable to this event.

END OF ABSTRACT

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: Braidwood 2; Event Date: May 11, 1989; Event Time: 0447;

Mode: 1 - Power Operation; Rx Power: 67%;

RCS AB! Temperature/Pressure: NOT/NOP

B. DESCRIPTION OF EVENT:

There were no systems or components inoperable at the beginning of the event which contributed to the severity of the event.

At 0447 on May 11, 1989, Braidwood 345 KV Bus 11 received a trip signal from Transmission Sub Station (TSS) 177. Bus 11 is where 345 KV Line 2004 connects to the Braidwood Switchyard. Line 2004 connects Braidwood to TSS 177 which is in Burnam, IL. As a result of this Trip signal the three Bus Tie Circuit Breakers (BTCB) EA! that connect Bus 11 to other busses in the Switchyard receive trip signals. BTCB's 7-11, 10-11, and 11-14 all tripped open as designed. The A Phase of BTCB 10-11 look longer than the five cycles allowed by the Local Breaker Backup (LBB) Relay initiation delay setting and an LOB signal was initiated which sent a trip signal to 345 KV Bus 10. Bus 10 is where the Braidwood 2 Main Generator (MP) EA! connects to the switchyard. The LBB signal sends a trip signal to BTCB 9-10 and both Unit 2 Main Generator Lockout Relays, 86G2A and 86G2B.

This caused a Generator Trip, Turbine Trip, Reactor Trip, and Feedwater Isolation to occur. The abrupt stop of steam flow from the turbine trip caused Steam Generator (SG) AB! level indication fluctuations as expected. However, the 2C SG Level spiked resulting in a SG Hi Hi Level Feedwater Isolation which trips the Feedwater Pumps (FW) SJ! in addition to isolating the Feedwater Isolation Valves.

As a result of the Feedwater Isolation and the 'shrink' effects of the Loss of Steam Flow on the SG Level indication the SG levels reached the Lo Lo Level setpoint and the Auxiliary Feedwater Pumps (AF) BA! auto started as anticipated. Stable plant conditions were immediately established.

At 0539 the 2B AF Pump was secured.

At 0540 the Nuclear Station Operator (NSO) (Licensed Reactor Operator) who was controlling SG levels with AF identified that the flow control valve from the 2A AF pump to the 2A SG, the 2AF005A, would not go full open. The valve was declared inoperable and the Technical Specification Action Statement 3.7.1.2.a. was entered. An Equipment Attendant (EA) (non-licensed operator) was dispatched to the valve.

At 0552 the EA isolated instrument air LD! to the 2AF005A. The valve failed open as designed. The NSO controlled flow to the 2A SG by throttling the Motor Operated isolation valve, 2AF013A.

At 0558 the Feedwater Isolation was reset.

At 0610 the Unit 2 Startup Feedwater Pump was started and normal feedwater flow was established to the Steam Generators.

At 0616 the 2A AF Pump was secured.

B. DESCRIPTION OF EVENT: (cont'd)

At 0737 the appropriate NRC notification via the ENS phone system was made pursuant to 10CFR50.72(b)(2)(ii).

This event is being reported pursuant to 10CFR50.73(a)(2)(iv) - any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

C. CAUSE OF EVENT:

The root cause of this event was a defective component. The Trip Coil Assembly for the A Phase of BTCB 10-11 'stuck' long enough for the protective relay to sense a pole disagreement. The relay initiated an LBB signal which caused the Generator Trip, Turbine Trip, Reactor Trip, and Feedwater Isolation.

The cause of the momentary indicated HI HI Level on the 2C SG has been attributed to pressure spikes from sudden loss of steam flow that occurs when the Turbine Stop Valves rapidly close. Discussions with the SG vendor, Westinghouse Corp., has identified that other plants with Westinghouse Model D5 Steam Generators have experienced similar short duration level oscillations on trips from full power. It is believed that the pressure spikes effect the upper tap of the level transmitter. This tap is exposed directly to the

steam.

The cause of the 2AF005A valve failure has been identified as a defective control card.

The cause of the trip signal from TSS 177 to Braidwood Switchyard Bus 11 has been attributed to noise on the microwave channels. Inspections of line 2004 have concluded that no real fault ever existed.

D. SAFETY ANALYSIS:

This event had no effect on the safety of the plant or the public. Both redundant trains of Reactor Protection JG! and Engineered Safety Features (ESF) JE! were operable, available, and performed their protective functions as designed.

Under the worst case conditions, the loss of the Switchyard Bus that powers the Auxiliary Transformers EA! concurrent with a Reactor Trip, the redundant Diesel Generators would supply the ESF electrical power requirements. This event is enveloped in Section 8 of the Updated Final Safety Analysis Report.

E. CORRECTIVE ACTIONS:

The immediate corrective actions were:

Establish stable plant conditions.

Reset the Feedwater Isolation. -Establish normal feedwater.and secure Auxiliary Feedwater.

Reset the 345 KV protective relays at both Braidwood and TSS 177 and reenergize 345 KV busses 10 and 11.

Additional corrective actions:

The A Phase Trip Coil on BTCB 10-11 was rebuilt the B and C Phase Trip Coils were inspected, and the Breaker was tested.

E. CORRECTIVE ACTIONS: (cont'd)

A fault analysis for the Braidwood Switchyard was performed by the System Planning Department. Based on the results of this analysis the following

actions were taken:

The LBB relay initiation delay setting for Oil Circuit Breaker BTCB 10-11 and all other Braidwood 345KV Switchyard Oil Circuit breakers has been raised from 5 cycles to 9.5 cycles.

The LBB relay initiation delay setting for all Air Circuit Breakers in the Braidwood 345KV Switchyard has been raised from 5 cycles to 7.5 cycles.

The defective control card for the 2AF005A flow control valve has been replaced. There has not been a failure history for this control card at Braidwood Station.

The level oscillation on the 2C SG is believed to be a spurious event and no corrective action is anticipated.

The Auditone microwave communication unit used at TSS 177 will be replaced. This will be tracked to completion by action item 457-200-89-04201.

F. PREVIOUS OCCURRENCES:

There was a previous occurrence of a loss of a Braidwood 345KV Switchyard Bus due to BTCB pole disagreement LBB initiation, LER/DVR 88-022-00 Docket 50-456/20-1-88-237. The corrective actions were implemented addressing both root and contributing causes. Previous corrective actions were-not applicable to this event.

G. COMPONENT FAILURE DATA:

Manufacturer Nomenclature Model Number MFG Part Number

Westinghouse Signal Converter 7300 series NMA-1 2838A34G01

2732m(060589)/5

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Commonwealth Edison
Braidwood Nuclear Power Station

Route #1, Box 84
Braceville, Illinois 60407
Telephone 815/458-2801

BW/89-669

June 6, 1989

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

The enclosed Licensee Event Report from Braidwood Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(iv) which requires a 30 day written report.

This report is number 89-002-00; Docket No. 50-457.

Very truly yours,

R. E. Querio
Station Manager
Braidwood Nuclear Station

REQ/PGH/jfe
(8399z)

Enclosure: Licensee Event Report No. 89-002-00

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Record Center
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